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TRAFFIC SPEED REPORT No. 60

SEPT., 1956
No. 34

**Joint
Highway
Research
Project**

**PURDUE UNIVERSITY
LAFAYETTE INDIANA**

by

R.J. HENNING

TRAFFIC SPEED REPORT NO. 60

TO: K. B. Woods, Director
Joint Highway Research Project

September 26, 1956

FROM: Harold L. Michael, Assistant Director

File: 8-1-1
C-36-10

The attached traffic speed report #60 is a summary of the semi-annual speed studies that are conducted at six locations in the vicinity of Lafayette. The speed study and the report has been prepared by Mr. Robert Henning, a member of our staff.

Average speeds for passenger cars are almost the same in the report as they were during the previous study. The average speed of trucks, however, has increased from two to three miles per hour.

As has been customary, this report will be distributed to the Bureau of Public Roads and Indiana State Police.

Respectfully submitted,

Harold L. Michael

Harold L. Michael, Assistant Director
Joint Highway Research Project

HLM:hb

cc: D. S. Berry
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TRAFFIC SPEED REPORT NO. 60

by

Robert J. Henning

Research Assistant

Joint Highway Research Project

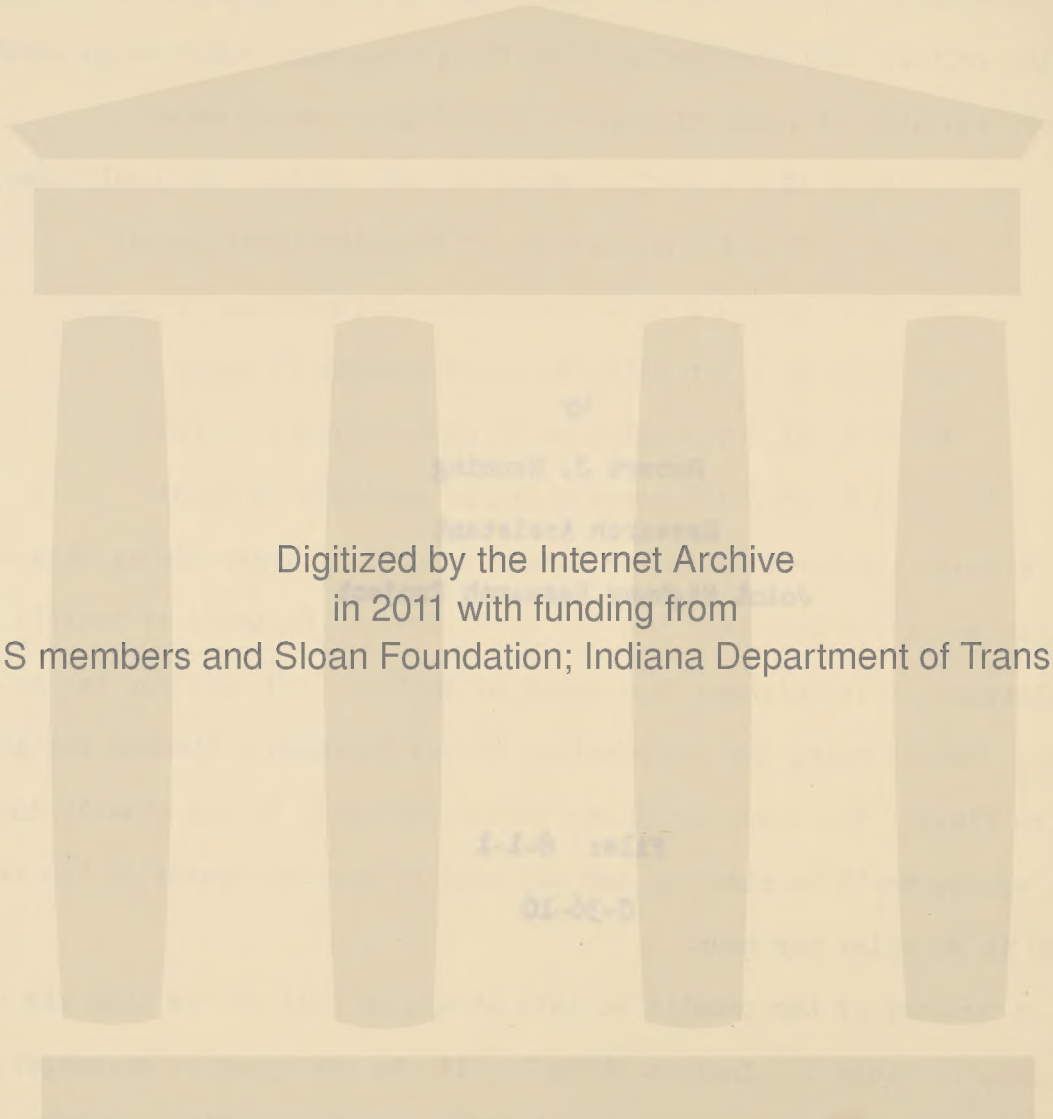
File: 8-1-1

C-36-10

Purdue University

Lafayette, Indiana

September 26, 1956



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TRAFFIC SPEED REPORT NO. 60

This report covers spot speed observations made during August and September 1956. These data were collected by K. R. Lauer, J. M. Pliego, and the writer. All observations are for free-moving vehicles on level, tangent sections of rural highways. Locations observed were:

1. U.S. 52 - 1.0 miles South of Jct. of S.R. 28 (Dual lanes)
2. U.S. 52 - 1.0 miles West of Klondike (Dual lands)
3. U.S. 52 - 2.2 miles Northwest of Templeton (2 lane)
4. U.S. 41 - 1.0 miles North of Boswall (2 lane)
5. U.S. 31 - 7.2 miles North of Perrysburg (2 lane)
6. S.R. 25 - 1.0 miles South of Americus (2 lane)

Because the Purdue speed indicator was out of order during this study, a radar meter was borrowed from Mr. R. G. Groves, Engineer of Traffic Regulations, State Highway Department of Indiana, and used for the entire study. Before using the radar meter, it was thoroughly checked for accuracy in the field. The speed meter was calibrated until it was clearly indicated that speeds could be observed and adjusted to correct speeds in the range of 20 to 80 miles per hour.

A summary of the results of this study, as well as the last six studies, is given in Table I. Indiana state law limits the speed of passenger cars and trucks weighing less than 5,000 pounds to 65 miles per hour, while trucks weighing more than 5,000 pounds are limited to 45 miles per hour. For this reason the truck speeds are divided into three groups, light trucks, heavy trucks, and all trucks. Because it is impractical to accurately ascertain the exact weight of each truck, panel and pick-up types are classed as less than 5,000 pounds, while dual tired and semi-

trailer types are classed as weighing over 5,000 pounds.

In order to facilitate comparison between the present and the last previous observation at a given location, the results are presented in tabular form in Tables II through VII. All speed observations were taken at the same locations for this study as for the last.

With the exception of light trucks, the average speeds of all types of vehicles changed only slightly since the last study. Indiana passenger cars increased their average speed only 0.1 mph. on two-lane highways, 54.9 mph. to 55.0 mph., while on four-lane highways it decreased from 58.1 mph. to 57.4 mph. Out-of-state passenger cars decreased their average speeds on both types of highways by dropping from 58.0 mph. to 56.3 mph., and from 60.1 mph. to 58.8 mph. on two-lane and four-lane highways respectively.

Light trucks showed larger changes in their average speeds than other types of vehicles, over the study made in February 1956. They increased from 47.1 mph. to 50.6 mph. on two-lane highways, and from 47.8 mph. to 49.6 mph. on four-lane highways. An increase was also noted for heavy trucks. On two-lane highways an increase from 44.4 mph. to 46.6 mph., and on four-lane highways from 45.8 mph. to 47.4 mph.

The change in speed of all passenger cars on all highways amounted to a decrease of only 0.4 mph. from 56.8 mph. to 56.4 mph. An increase of 2.0 mph. was recorded for all trucks on all highways. The average speed of all trucks was found to be 46.9 mph. during this study.

TABLE I

SUMMARY OF SPOT SPEED OBSERVATIONS ON INDIANA HIGHWAYS

(Free-Moving Vehicles on Level, Tangent Sections)

		Passenger Cars				Trucks		
		Ind. Mean	Non-Ind. Mean	All Mean	All 85-Per.	Light Mean	Heavy Mean	All Mean
Two-Lane Highways	Dec. '53	51.5	55.9	53.2	61.6	44.0	42.2	43.0
	Apr. '54	53.6	56.5	54.8	63.6	44.8	42.9	43.7
	Aug. '54	55.0	56.8	55.7	63.8	49.9	46.0	47.1
	Dec. '54	52.0	54.1	52.8	58.8	48.2	44.4	45.2
	July '55	53.8	55.7	54.5	64.8	46.2	45.5	45.6
	Feb. '56	54.9	58.0	55.9	63.2	47.1	43.2	44.4
	Aug. '56	55.0	56.3	55.5	63.4	50.6	45.5	46.6
Four-Lane Highways	Dec. '53	52.1	55.8	53.4	61.5	44.7	40.1	41.6
	Apr. '54	56.4	58.8	57.3	66.0	43.7	41.7	42.2
	Aug. '54	55.5	58.2	56.6	65.0	52.1	45.6	47.1
	Dec. '54	54.2	55.7	54.7	60.4	47.1	43.6	44.3
	July '55	54.5	56.6	55.2	63.7	47.5	43.9	44.8
	Feb. '56	58.1	60.1	58.7	65.7	47.8	45.2	45.8
	Aug. '56	57.4	58.8	58.2	66.8	49.6	46.0	47.4
All Highways	Dec. '53	51.7	55.9	53.3	61.6	44.2	41.4	42.6
	Apr. '54	54.6	57.3	55.6	64.4	44.5	42.5	43.3
	Aug. '54	55.1	57.3	56.0	64.2	50.5	45.9	47.1
	Dec. '54	52.7	54.5	53.4	59.3	47.8	44.0	44.8
	July '55	54.1	56.6	55.2	64.3	46.9	44.7	45.2
	Feb. '56	56.0	58.6	56.8	63.8	47.3	44.0	44.9
	Aug. '56	55.7	57.3	56.4	64.5	50.2	45.6	46.9

APPENDIX

Truck types are classified as follows:

2P	2 Axle panel or pickup
2S	2 Axle, 4 tired other than 2P
2D	2 Axle, 6 tired
3	3 Axle Single Unit
2S1	2 Axle tractor-truck with 1 axle semi-trailer
2S2	2 Axle tractor-truck with 2 axle semi-trailer
2-2	2 Axle tractor-truck pulling 2 axle full trailer
2S1-2	2 Axle tractor-truck with 1 axle semi-trailer and a 2 axle full trailer
3-3	3 Axle truck pulling 3 axle full trailer
3S2-2	3 Axle tractor-truck with a 2 axle semi-trailer and a 2 axle full trailer

Body type code:

CO	Covered, box, closed, delivery, panel, screen, top, van.
PL	Platform, flat bed.
ST	Stake, crate, rack
TA	Tank
OP	Open, pickup
REF	Refrigerator
AC	Autocarrier
DP	Dump
LI	Lime spreader
BL	Not reportable in any of the above classifications.

TABLE III SPEED DATA

Station U.S. 52 1.0 Miles West of Klondike

Surface 24' Portland Cement Concrete (Divided Lanes)

Weather clear

Last Previous Observation (Speed Report No. 58)

This observation

Date August 20, 1956

Time 1:45 PM - 4:15 PM

Date February 23 and 29, 1956

Time 8:30 - 10:20 AM; 1:40-3:30 PM

	PASSENGER CARS										TRUCKS										BUSES					
	All					Indiana					Not-Indiana					Less than 5000 pounds						5000 pounds or more				
	Last	Present	Last	Present	Last	Last	Present	Last	Present	All	Last	Present	Last	Present	Last	Last	Present	Last	Present	Last		Present				
-Bonded																										
No. of Vehicles Obs.	352	394	278	190	74	204	57.8	46.7	47.5	108	33	33	118	75	118	46.7	46.1	38.0	1	0						
Ave. Speed (M.P.H.)	60.4	57.1	59.9	56.4	62.5	57.8	—	64.2	61.1	—	47.0	41.1	46.7	46.1	46.7	67.8	61.3	—	—	—						
25 M.P.H.	92.6	81.0	92.1	76.8	94.6	84.8	—	39.1	25.9	—	51.5	60.8	37.3	22.7	37.3	5.1	—	—	—	—						
30 M.P.H.	77.3	68.8	74.3	65.8	86.5	71.6	—	7.9	6.5	—	18.2	21.2	0.8	—	0.8	—	—	—	—	—						
35 M.P.H.	63.6	45.2	60.4	43.2	75.7	47.1	—	3.3	2.8	—	12.1	9.1	0.8	—	0.8	—	—	—	—	—						
40 M.P.H.	32.4	13.3	30.2	12.6	40.5	23.5	—	1.3	1.8	—	3.0	6.1	0	—	0	—	—	—	—	—						
45 M.P.H.	7.4	3.8	6.1	1.6	12.2	5.9	—	0	0.9	—	0	3.0	0	—	0	—	—	—	—	—						
50 M.P.H.	0.9	0.5	0.4	—	2.7	1.0	—	0	—	—	0	—	0	—	0	—	—	—	—	—						
No. of Vehicles Obs.	189	201	149	83	40	113	—	65	51	—	12	11	53	40	53	46.5	44.2	—	—	—						
Ave. Speed (M.P.H.)	58.9	55.9	53.5	54.6	60.4	56.3	—	46.9	44.5	—	43.9	45.4	46.5	44.2	46.5	65	52	—	—	—						
Max. Speed (M.P.H.)	—	—	74	67	71	78	—	—	—	—	68	54	65	52	65	2D	2D ST	—	—	—						
State of Reg.	—	—	—	—	Ill.	Ill. N.Y.	—	—	—	—	2P	2P CO	2D	2D ST	2D	2D ST	—	—	—	—						
Max. Speed (M.P.H.)	—	—	36	35	35	37	—	—	—	—	34	33	24	35	24	35	—	—	—	—						
State of Reg.	—	—	—	—	—	Wisc.	—	—	—	—	2P	2P CO	2D	3 RL	2D	3 RL	—	—	—	—						
No. of Vehicles Obs.	163	193	129	107	34	86	—	86	57	—	21	22	65	35	65	35	—	—	—	—						
Ave. Speed (M.P.H.)	62.2	58.5	61.5	57.3	65.1	59.3	—	46.6	48.3	—	45.9	49.5	46.7	48.3	46.7	48.3	38.0	—	—	—						
Max. Speed (M.P.H.)	—	—	78	72	75	76	—	—	—	—	60	74	54	53	54	53	38	—	—	—						
State of Reg.	—	—	—	—	Ill.	Ohio	—	—	—	—	2P OP	2P OP	3S2 2D	2DST/28200	3S2 2D	2DST/28200	—	—	—	—						
Max. Speed (M.P.H.)	—	—	34	35	47	36	—	—	—	—	29	39	22	40	22	40	33	—	—	—						
State of Reg.	—	—	—	—	—	Ohio	—	—	—	—	2P ST	2P OP	2D DP	2D CO	2D DP	2D CO	—	—	—	—						

TABLE IV
SPEED DATA

Station U.S. 52 2.0 Miles North of Templeton

Surface 22' Rock Asphalt

This Observation

Date August 21, 1956

Time 9:30 AM - 11:45 AM

Weather clear

Last Previous Observation (Speed Report No. 58)

Date February 20, 1956

Time 9:00 AM - 12:10 PM

PASSENGER CARS										TRUCKS						BUSES	
OBSERVATION	All			Indiana		Non-Indiana		All		Less than 5000 pounds		5000 pounds or more		All			
	Last	Present	Ave.	Last	Present	Last	Present	Last	Present	Last	Present	Last	Present	Last	Present		
No. of Vehicles Obs.	362	424		176	177	186	247	139	75	27	11	112	64	1	0		
Ave. Speed (m.p.h.)	56.8	57.7		55.7	56.7	57.8	57.6	44.1	47.0	47.7	56.0	43.3	45.4	47.0	-		
Max. Speed (m.p.h.)	86.2	82.1		81.2	78.5	90.9	84.6	43.2	42.7	66.7	-	37.5	32.3	100.0	-		
Min. Speed (m.p.h.)	67.7	50.9		61.9	52.5	73.1	49.8	16.5	18.7	40.7	72.7	10.7	9.4	0	-		
State or Type	39.8	22.4		35.2	19.8	44.1	24.3	5.0	10.7	25.9	36.4	0	6.2	0	-		
State or Type	10.2	5.9		6.3	5.1	13.4	6.5	2.9	1.3	14.3	9.1	0	0	0	-		
State or Type	1.7	0.5		2.3	0.6	0.5	0.4	0.7	1.3	3.7	9.1	0	0	0	-		
State or Type	0	0.2		0	0	0	0.4	0	0	0	0	0	0	0	-		
No. of Vehicles Obs.	150	184		85	97	65	87	88	42	17	7	71	35	1	-		
Ave. Speed (m.p.h.)	56.2	56.6		55.7	56.5	56.8	56.6	43.2	45.6	46.6	55.6	42.3	43.6	47.0	-		
Max. Speed (m.p.h.)	-	-		73	78	68	72	-	-	63	70	53	53	47	-		
Min. Speed (m.p.h.)	-	-		-	-	111.	111.	-	-	2P	2P CO	2D	2D BL	-	-		
State or Type	-	-		32	40	35	38	-	-	26	52	35	38	47	-		
State or Type	-	-		-	-	111.	111.	-	-	2P	2P OP	2S1	2D 2S2	-	-		
No. of Vehicles Obs.	212	240		91	80	121	160	51	33	10	4	41	29	0	-		
Ave. Speed (m.p.h.)	57.3	57.3		55.8	56.8	58.4	58.1	45.9	48.8	49.7	56.8	44.9	47.7	-	-		
Max. Speed (m.p.h.)	-	-		72	73	69	80	-	-	65	63	51	64	-	-		
Min. Speed (m.p.h.)	-	-		-	-	111.	Ohio 111.	-	-	2P	2P CO	2S2	2D BL	-	-		
State or Type	-	-		31	38	44	40	-	-	34	53	35	40	-	-		
State or Type	-	-		-	-	111.	Ohio	-	-	2P	2P OP	2D	2S2	-	-		



TABLE V

SPEED DATA

Station U.S. 41 1.0 Miles North of Boswell

Surface 22.5' Portland Cement Concrete

Weather clear

This Observation Last Previous Observation (Speed Report No. 58)

Date August 23, 1956

Date February 10, 1956

Time 2:00 - 4:30 PM

Time 10:30 AM - 2:30 PM

PASSENGER CARS										TRUCKS										BUSES			
OBSERVATION	All			Indiana		Non-Indiana		All		Less than 5000 pounds			5000 pounds or more			All							
	Last	Present		Last	Present	Last	Present	Last	Present	Last	Present		Last	Present		Last	Present	Last	Present	Last	Present	Last	Present
No. of Vehicles Obs.	360	395		176	193	184	202	140	105	59	20		81	85		0		0		0		1	
Ave. Speed (m.p.h.)	58.0	54.4		56.7	53.8	59.4	54.9	45.0	45.6	45.0	43.2		45.1	44.9		-	-	-	-	-	-	42.0	
45 m.p.h.																							
50 m.p.h.	86.9	75.2		80.1	72.5	93.5	77.7	49.3	76.2	44.1	80.0		53.1	75.3		-	-	-	-	-	-	0	
55 m.p.h.	71.7	46.3		65.3	43.0	77.7	50.5	24.3	39.0	30.5	60.0		19.8	34.1		-	-	-	-	-	-	0	
60 m.p.h.	48.9	23.3		43.7	22.8	53.3	24.3	7.1	14.3	11.9	25.0		3.7	11.8		-	-	-	-	-	-	0	
65 m.p.h.	20.3	6.8		21.0	6.2	19.6	7.4	0.7	1.9	1.7	5.0		0	1.2		-	-	-	-	-	-	0	
70 m.p.h.	1.9	3.0		1.7	4.1	2.2	2.0	0	1.0	0	0		0	1.2		-	-	-	-	-	-	0	
75 m.p.h.	0.3	1.0		0	1.6	0.5	0.5	0	0	0	0		0	0		-	-	-	-	-	-	0	
No. of Vehicles Obs.	142	213		75	97	67	116	63	45	27	9		36	36		-	-	-	-	-	-	1	
Ave. Speed (m.p.h.)	57.7	52.9		56.7	52.2	58.9	53.6	45.1	43.6	45.3	47.9		44.6	42.5		-	-	-	-	-	-	42.0	
Max. Speed (m.p.h.)				70	75	69	71			56	62		58	58		-	-	-	-	-	-	42	
State or Type						Ill.	Ill.			2P	2P OP		2D	2D ST		-	-	-	-	-	-	-	
Min. Speed (m.p.h.)				34	38	42	40			31	40		32	29		-	-	-	-	-	-	42	
State or Type						Ill.	Ill.			2P	2P OP		2S2	2D DP		-	-	-	-	-	-	-	
No. of Vehicles Obs.	218	182		101	96	117	86	77	60	32	11		45	49		-	-	-	-	-	-	0	
Ave. Speed (m.p.h.)	58.3	56.0		56.7	55.4	60.0	56.7	45.0	47.0	44.4	48.5		45.4	46.7		-	-	-	-	-	-	-	
Max. Speed (m.p.h.)				71	89	88	85			61	58		56	65		-	-	-	-	-	-	-	
State or Type						Ill.	Tenn.			2P	2P OP		2D	2S2 CO		-	-	-	-	-	-	-	
Min. Speed (m.p.h.)				34	34	36	40			25	39		29	36		-	-	-	-	-	-	-	
State or Type						Ill.	Ill.			2P	2P CO		3S2	2D ST		-	-	-	-	-	-	-	

TABLE

SPEED DATA

VI

Station U.S. 31 7.2 Miles North of Perrysburg

Surface 22.5' Portland Cement Concrete, Resurfaced with Bituminous Material Weather clear

This Observation Last Previous Observation (Speed Report No. 58)

Date September 4, 1956

Date February 15, 1956

Time 10:30 AM - 1:45 PM

Time 11:00 AM - 3:00 PM

PASSENGER CARS				TRUCKS				BUSES									
All				Less than 5000 pounds				5000 pounds or more				All					
OBSERVATION				Indiana		Non-Indiana		All		Last		Present		Last		Present	
No. of Vehicles Obs.				Last	Present	Last	Present	Last	Present	Last	Present	Last	Present	Last	Present	Last	Present
Ave. Speed (m.p.h.)				388	413	315	323	73	90	109	86	41	19	68	67	2	2
Max. Speed (m.p.h.)				53.8	54.3	53.3	53.7	56.2	56.3	44.2	45.9	46.1	48.5	43.1	45.1	52.5	55.5
Min. Speed (m.p.h.)				—	—	—	—	—	—	34.9	58.1	43.9	68.4	29.4	55.2	50.0	100.0
State or Type				74.7	75.1	72.1	73.1	86.3	82.2	14.7	29.1	31.7	52.6	4.4	22.4	50.0	100.0
State or Type				49.0	54.2	46.7	51.1	58.9	65.6	2.8	7.0	7.3	16.8	0	4.5	50.0	100.0
State or Type				27.8	28.8	26.3	26.9	34.2	35.6	1.8	1.2	4.9	0	1.5	50.0	0	0
State or Type				4.9	6.5	4.8	5.9	5.5	8.9	0	0	0	0	0	0	0	0
State or Type				0.8	1.4	0.3	0.9	2.7	3.3	0	0	0	0	0	0	0	0
State or Type				0	0	0	0	0	0	0	0	0	0	0	0	0	0
No. of Vehicles Obs.				195	190	164	149	31	41	57	41	24	9	33	32	1	1
Ave. Speed (m.p.h.)				53.6	54.6	53.2	54.4	56.0	55.7	43.7	45.1	44.8	47.4	42.9	44.5	44.0	56.0
Max. Speed (m.p.h.)				—	—	70	72	71	69	—	—	59	53	51	54	44	56
State or Type				—	—	—	—	Mich.	Mich.	—	—	2P OP	2P CO	2S1 CO	2S2 CO	—	—
Min. Speed (m.p.h.)				—	—	30	32	44	37	—	—	34	41	29	20	44	56
State or Type				—	—	—	—	Ill.	Mich.	—	—	2P OP	2P OP	2S2 CO	2D ST	—	—
No. of Vehicles Obs.				193	223	151	174	42	49	52	45	17	10	35	35	1	1
Ave. Speed (m.p.h.)				54.0	54.0	53.3	53.2	56.3	56.9	44.8	46.6	47.8	49.5	43.4	45.7	61.0	55.0
Max. Speed (m.p.h.)				—	—	67	70	74	74	—	—	63	58	50	64	61	55
State or Type				—	—	—	—	Ill.	Mich.	—	—	2P OP	2P OP	2S2 PL	2S2 PL	—	—
Min. Speed (m.p.h.)				—	—	30	30	40	38	—	—	35	40	34	30	61	55
State or Type				—	—	—	—	Ill.	Mich.	—	—	2D ST	2P OP	2S1 St	2S2 ST	—	—



Station S.R. 25 1.0 Miles South of Americus

Surface 22' Bituminous Resurfaced Concrete

This Observation

Date August 23, 1956

Time 9:00 AM - 11:30 AM

Last Previous Observation (Speed Report No. 58)

Date February 16 and 21, 1956

Time 1:30 - 11:00 AM and 8:30-9:45 AM

Weather clear

PASSENGER CARS										TRUCKS				BUSES	
OBSERVATION	All			Indiana		Non-Indiana		All		Less than 5000 pounds		5000 pounds or more		All	
	Last	Present	406	Last	Present	Last	Present	Last	Present	Last	Present	Last	Present	Last	Present
No. of Vehicles Obs.	359	406		321	332	38	74	146	95	40	28	106	67	0	1
Ave. Speed (m.p.h.)	55.0	56.0		55.0	56.1	55.3	55.7	44.8	48.1	50.8	51.6	41.8	46.6	-	54.0
Max. Speed (m.p.h.)	78.8	83.5		73.2	84.6	84.2	78.4	38.4	66.3	77.5	78.6	23.6	61.2	-	100.0
Min. Speed (m.p.h.)	51.3	59.8		50.8	60.2	55.3	58.1	21.2	36.3	57.5	60.7	7.5	26.9	-	0
State or Type	30.9	34.0		32.1	34.0	21.1	33.8	8.2	16.3	27.5	39.3	0.9	7.5	-	0
State or Type	9.5	12.1		8.7	12.0	15.8	12.2	4.8	8.4	15.0	21.4	0.9	3.0	-	0
State or Type	1.9	4.7		2.2	4.8	0	4.1	2.1	3.2	7.5	10.7	0	0	-	0
State or Type	0.6	1.0		0.6	0.9	0	1.4	1.4	0	5.0	0	0	0	-	0
State or Type	192	213		176	173	16	40	60	50	15	14	45	36	-	0
State or Type	55.7	57.2		55.9	57.4	53.8	56.4	43.1	48.4	49.4	51.3	41.0	47.2	-	-
State or Type	-	-		80	77	65	74	-	-	70	66	61	64	-	-
State or Type	-	-		-	-	Ill.	Mich.	-	-	2P	OP	2D	ST	2D	CO
State or Type	-	-		22	40	43	39	-	-	35	30	27	38	-	-
State or Type	-	-		-	-	Penn.	Mich.	-	-	2P	OP	2S	CO	2D	ST
State or Type	167	193		145	159	22	34	86	45	25	14	61	31	-	1
State or Type	54.2	54.8		53.9	54.8	56.4	54.9	45.8	47.8	51.6	51.9	42.4	45.9	-	54.0
State or Type	-	-		75	78	68	78	-	-	70	68	53	58	-	54.0
State or Type	-	-		-	-	Ohio	Mich.	-	-	2P	OP	2D	CO	2D	CO
State or Type	-	-		34	27	44	41	-	-	36	41	26	31	-	54.0
State or Type	-	-		-	-	Ohio	Ill.	-	-	2P	OP	2S	ST	2D	DP
State or Type	-	-		-	-	-	-	-	-	-	-	-	-	-	-

10-

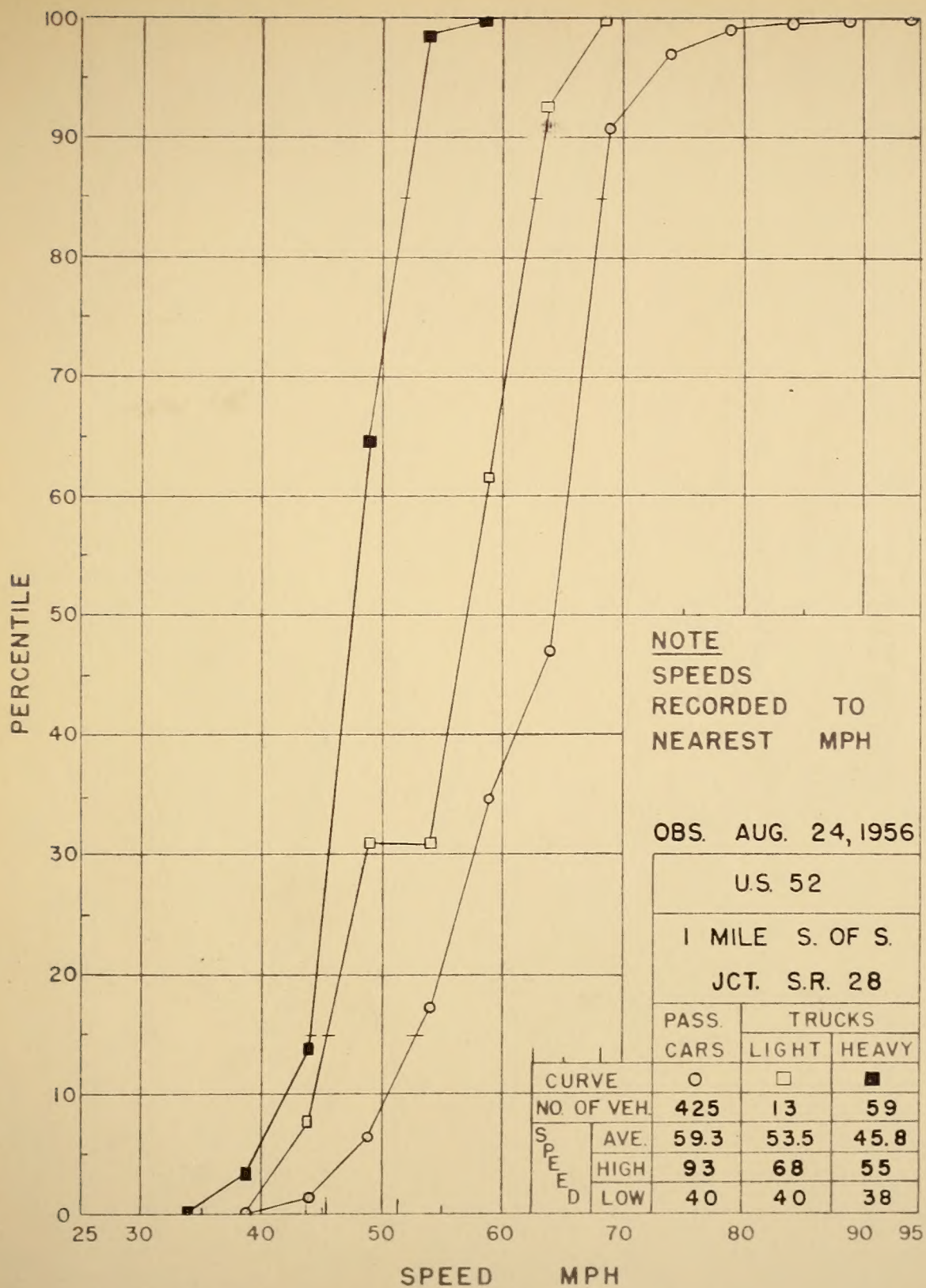


FIGURE 1

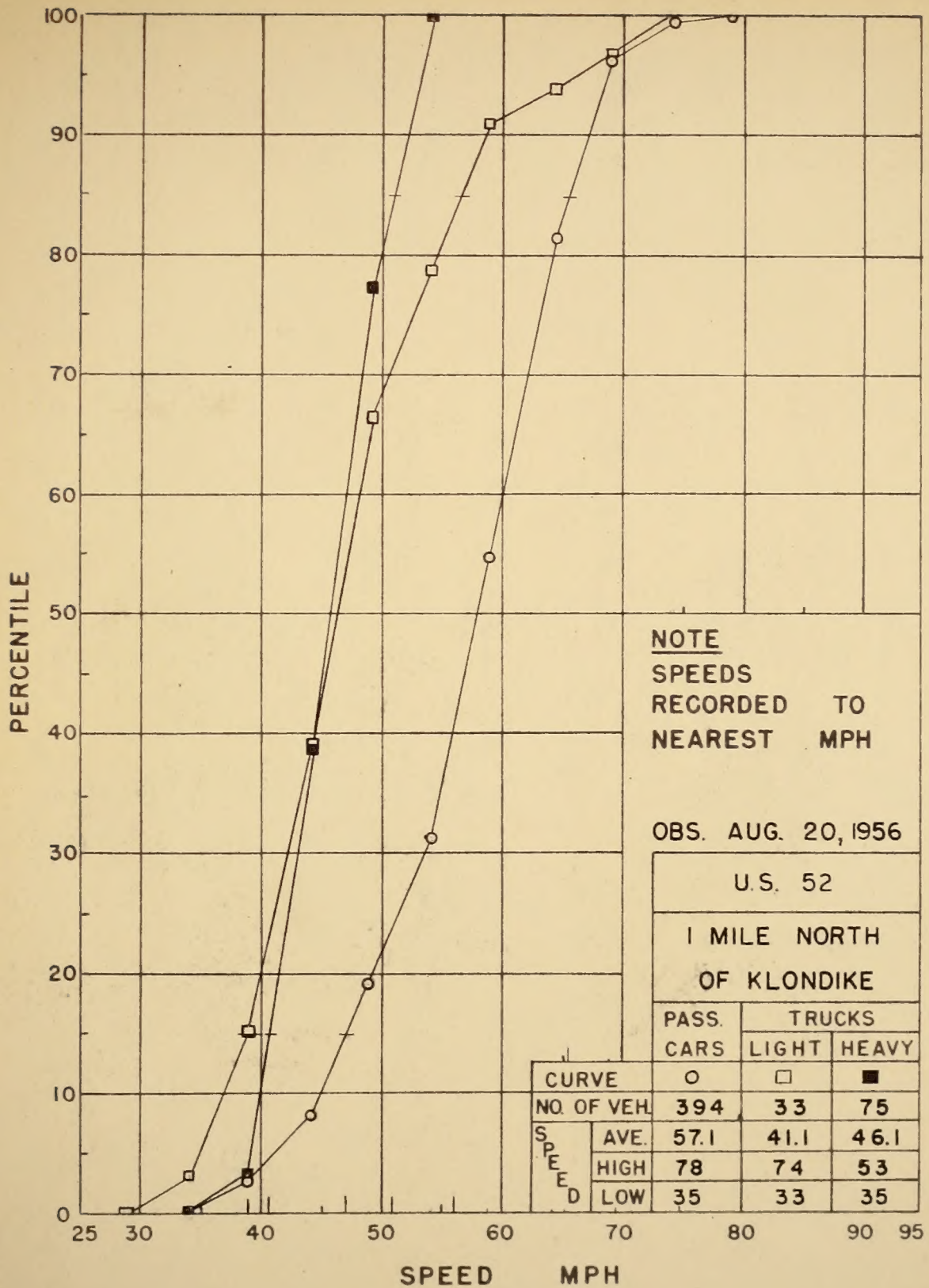


FIGURE 2

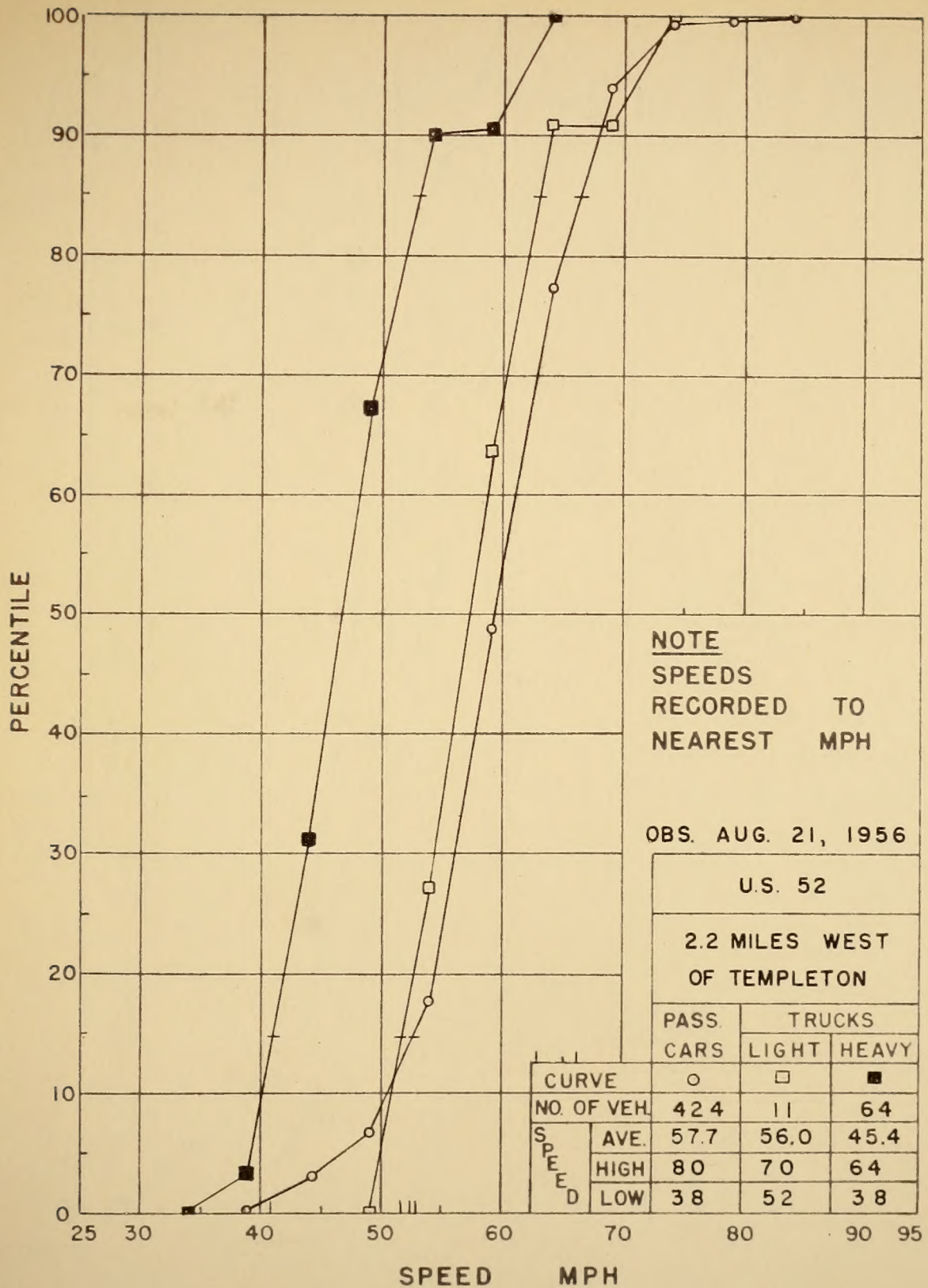


FIGURE 3

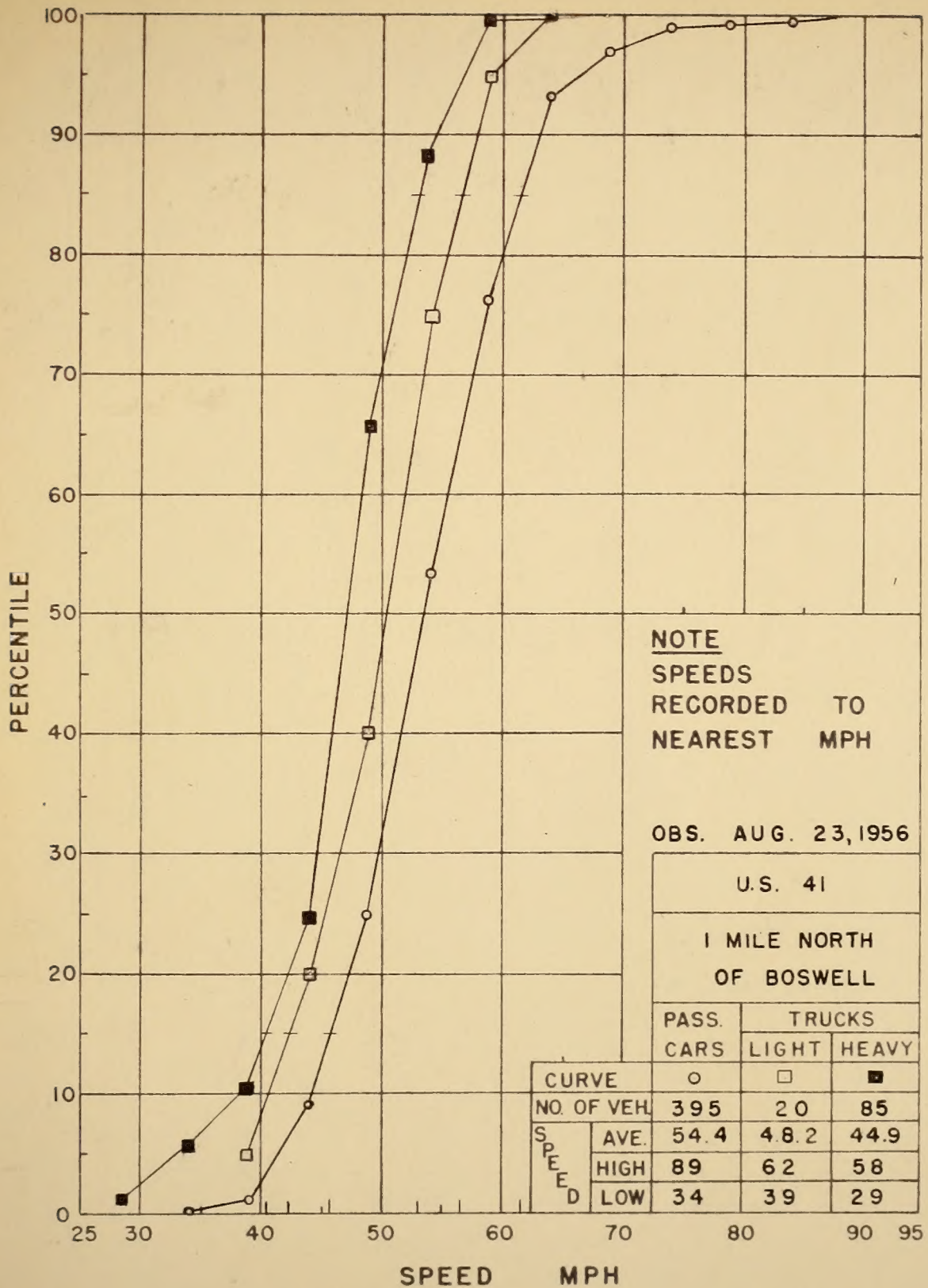


FIGURE 4

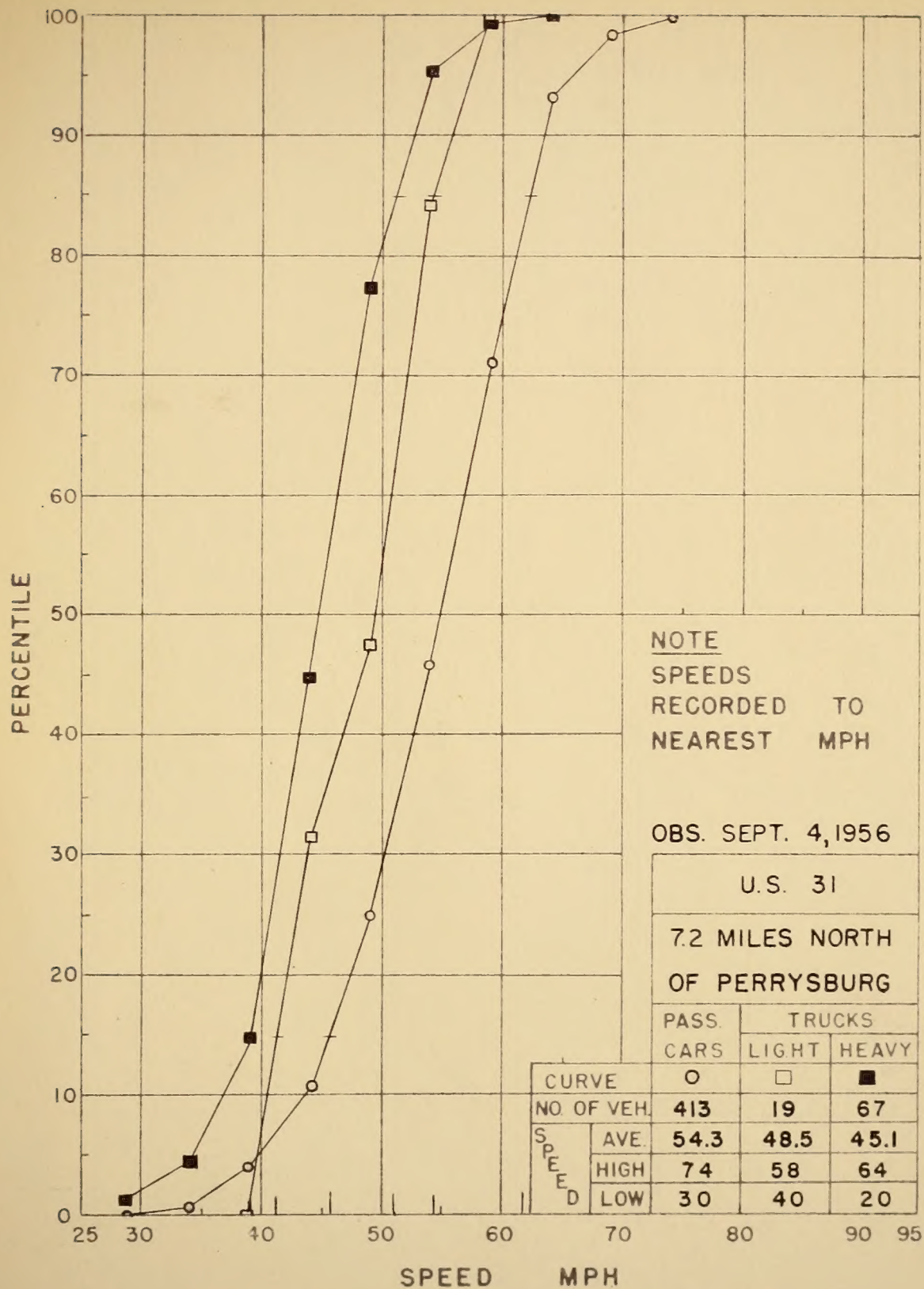


FIGURE 5

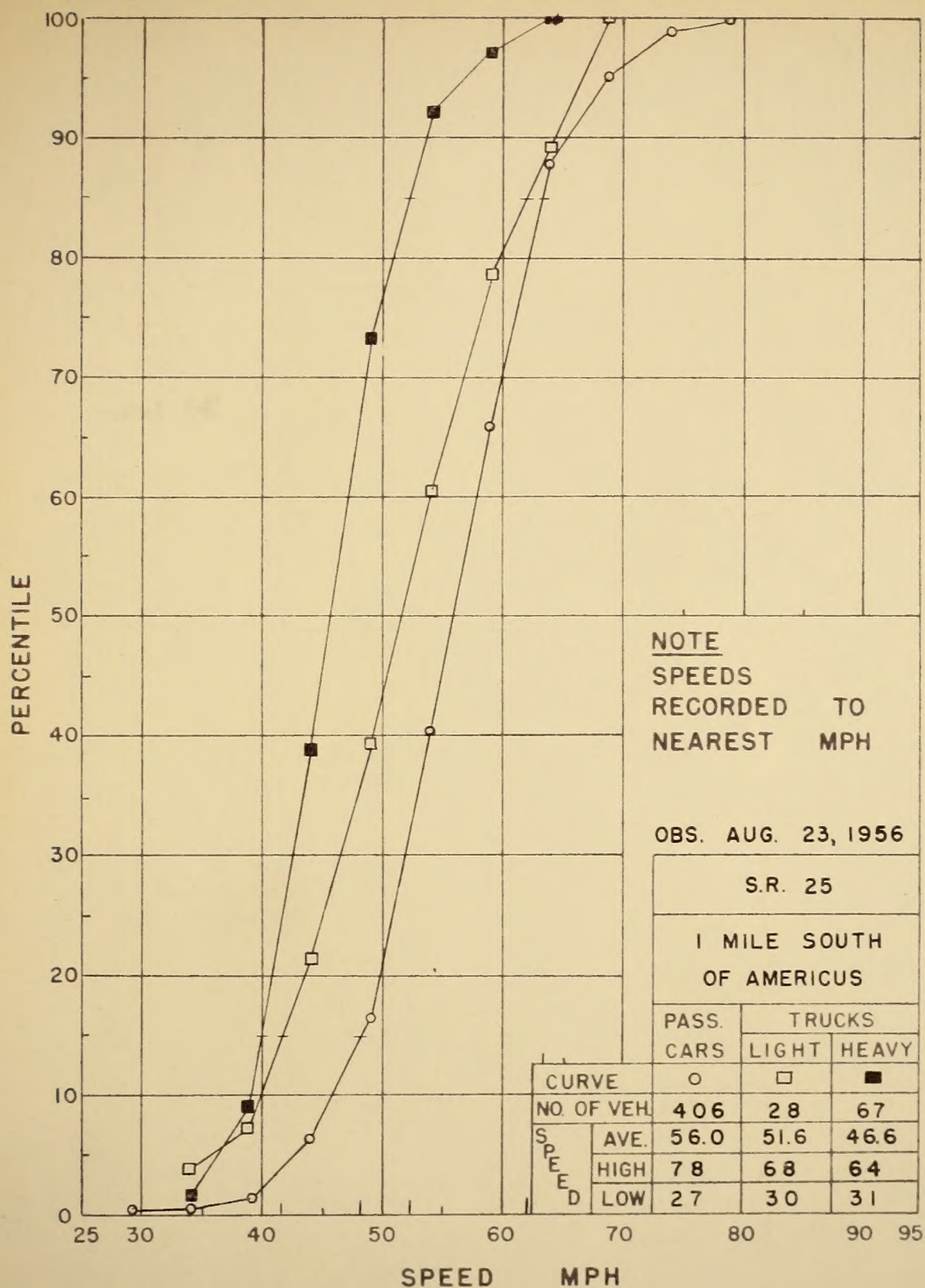


FIGURE 6

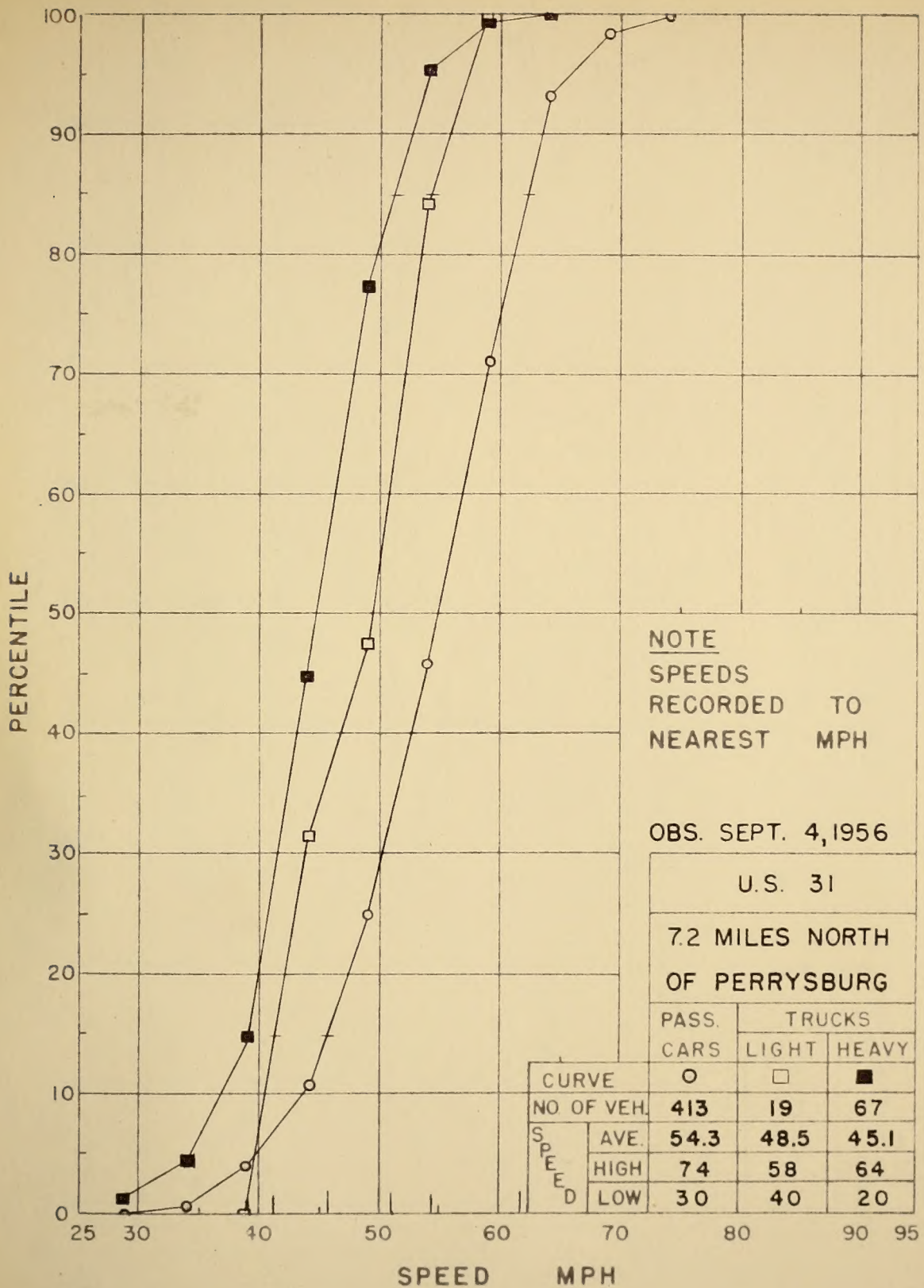


FIGURE 5

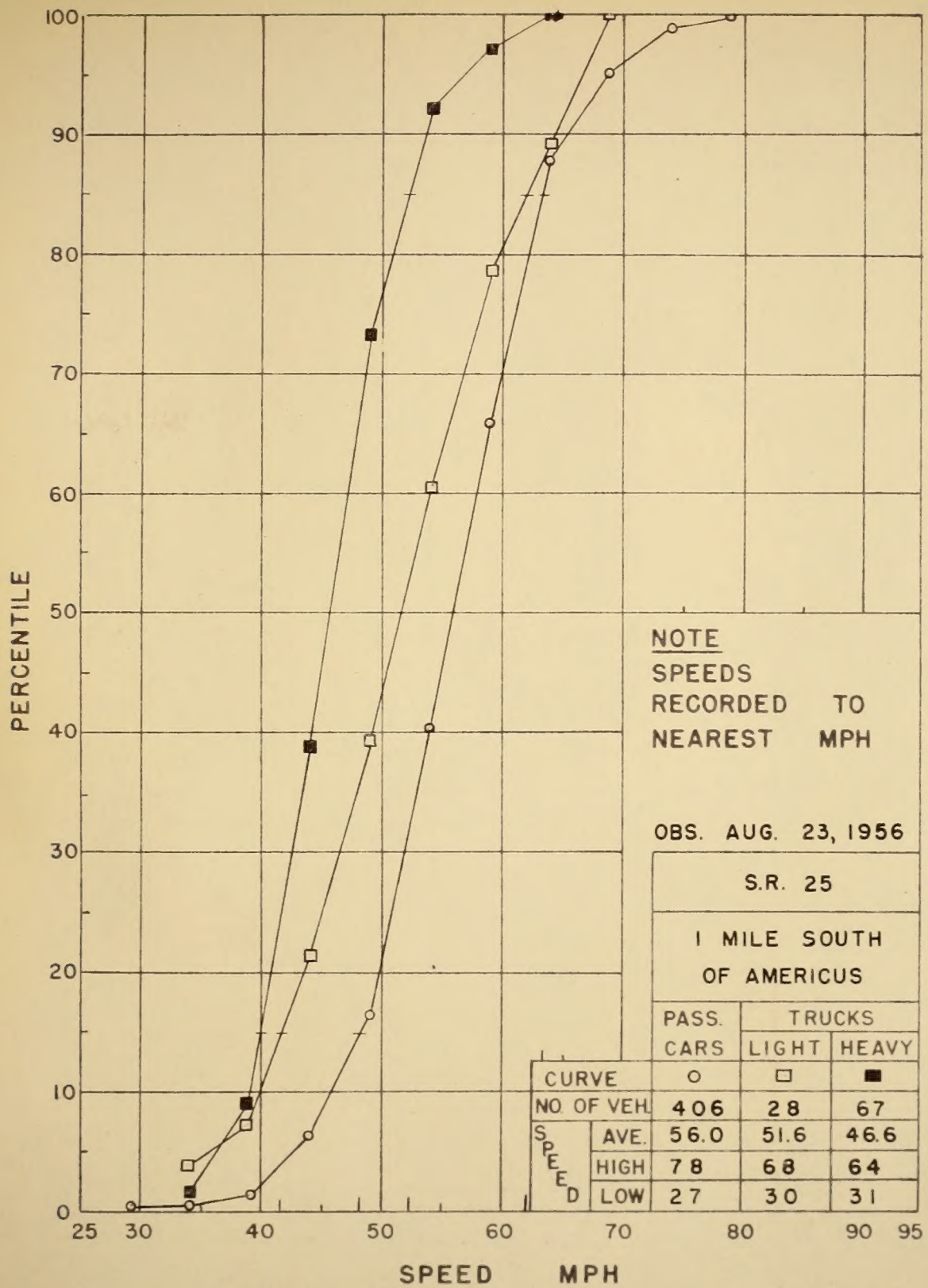


FIGURE 6



